French Experience in waste recovery in cement kilns

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SVP Industrial Ecology
Lafarge in brief

) Worldwide leader in Building materials
  • N° 1 in Cement and Roofing
  • N° 2 in Aggregates and Concrete
  • N° 3 in Gypsum

) A long term commitment to Sustainable Development
  • Lafarge’s culture close to SD principles
  • Those principles are particularly key for the cement industry

) Industrial Ecology is one of the corner stones of Lafarge commitment’s to SD
  • It saves non renewable resources (2 M TOE in 2010)
  • It is a sound waste disposal service to the community (8 Mt)
  • It tackles climate change (6 Mt of CO₂)
Lafarge pioneered recovery of wastes in cement kilns at the end of the seventies in France and in the USA.

Lafarge has extensively developed Industrial Ecology worldwide over the past ten years:
- In mature countries AF range from 25 to 80%
Lafarge co-processes waste in 30 countries
5,500,000 Tonnes of wastes have been co-processed by Lafarge in 2005

800,000 Tonnes of Hazardous Wastes
The French Experience: a bit of history

) First industrial trial test burn at “Desvres” plant at the end of the seventies

) First co-processing licence to operate granted to “Barlin” plant at the beginning of the eighties

) Qualification campaign on the 3 types of cement process at the end of the eighties

) Steady growth since mid eighties:
  • The whole French cement industry involved
  • Only 2 cement plants out of the 29 still not authorized for co-processing
  • 32% fuel replacement in 2004
An historical Recognition

Co-processing in cement kiln has been recognized and supported by the French Government from the early beginning and reinforced thanks to Qualification Campaigns.

1) The French Cement Industry took the initiative to perform a very comprehensive measurement program together with the Administration in order to qualify the co-incineration as part of the French standards.

2) This 2 years program (1989-1990) covered wet, “Lepol” and dry process.

3) Specifications for the measurement campaigns were defined by ADEME (French EPA).

4) Pollutants: POHC’s, NOx, SO2, HCl, total dust, heavy metals,
Main outcomes of the Qualification Campaigns

- Rate of Destruction for POCHC’s > 99.99%

- No significant difference on NOx, SO2 and HCl whatever the fuel mix used during the trials, even improvement on NOx

- No difference on heavy metals either with emissions 80% below Emission Limit Values

- Product of Incomplete Combustion < 5 ppm with no difference between with and without waste
Co-processing has been regulated since early eighties

Co-processing has been first regulated under the French Waste Law (first issue in 1975):

- Cement kiln agreement for used oils disposal
- “Cradle to Grave” follow up (1977, 1985)
- Pre-treatment of waste before co-processing (1985)
- Regulation on incineration and co-incineration (1986)

Recognition by Water Agencies who has supported Hazardous Waste disposal through incentive for sound solution

Specific authorisations under the French Law on industrial activities

- First co-processing permits in 1982
- First pre-treatment permit in 1984
No contradiction with the European Regulatory Framework

) In Europe, Environmental Legislation has always been strongly driven by the Commission and the Parliament

) Thematic Strategy and Waste Framework Directive are currently under review ⇒ Moving to a Recycling Society

) Many Directives and regulations were issued on waste disposal (Incineration, Landfill, waste shipment, used oils, …)

) IPPC Directive also covers waste recovery in cement kilns:
  • Pre-treatment BREF
  • Revision of the Cement and Lime BREF

Co-processing in cement kilns is fully embedded in European regulation on waste disposal
Wastes Categories recovered in cement kilns in France

1) Industrial hazardous wastes
   • Solvents and liquid organic blends
   • Organic sludge (paint sludge, resins)
   • Petroleum wastes (tank bottoms, cutting oils)
   • Special chemicals
   • Waste water (cutting emulsion, chemical water)

2) Used oils

3) Used tires
Wastes Categories recovered in cement kilns in France

- Contaminated soils
- Biomass
  - Animal meal
  - Sewage sludge
  - Wood (chips, sawdust)
  - Off spec seeds
- Municipal waste
  - RDF (dry fraction, plastic, paper)
  - Construction & Demolition wood
- Commercial and non hazardous industrial wastes
  - Mainly plastic, textiles, wood, paper and cardboard
In France Co-processing has a Strong Position in Waste Recovery

Despite historical traditional incineration capacity, Cement kiln co-processing has reached ~ 50 % market share in hazardous wastes incineration in France
A full coverage of the French territory

- Cement Production: 22 Mt
- 29 plants, 35 kilns
- 1.625 Mt of waste co-processed
- 800,000 t of hazardous wastes

Legend:
- Authorized Cement Plants
- Not yet authorized Cement Plants
- TSDF + > 12 transfer facilities
In 2004 the European Cement Industry replaced 17% of its fossil fuels consumption with waste, thus sparing about 4 millions tonnes of coal

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<th>Waste Type</th>
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<td>Sludge</td>
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Leading Countries show that better recovery can be achieved in Europe

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(Holland: 80%)